

entity, wherein said desired entity comprises a record identified by said desired record identifier in said desired entity instance table.

Please add new claims 100.

--100. (New) The relational database processing system of Claim 69, wherein said entity definition table means further comprises:

a second entity type record containing a second entity type and specifying a second entity instance table associated with said second entity type; and

a third entity type record containing a third entity type and specifying said second entity instance table, thereby also associating said second entity instance table with said third entity type.--

REMARKS

Applicant's Attorneys wish to thank the Examiner for the telephone interview of April 15, 1996. The Examiner stated that the entity definition table of the present invention does not read on the prior art of record. However, the Examiner did not believe that the claims clearly recited the distinguishing features of the entity definition table. Therefore, Claim 69 and Claim 82 have been amended as requested by the Examiner to more clearly recite the features of the entity definition table. Furthermore, new claim 100, dependent upon claim 69, includes further limitations on the entity definition table.

Claims 69-71 and 82-85 were pending in the above-identified application when last examined. Claim 100 is added by this amendment. Therefore, Claims 69-71, 82-85, and 100 are at issue.

Claim 69 has been amended to recite

(i) entity definition table means comprised of at least one entity type record containing an entity type, and specifying an entity instance table associated with

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said entity type...

This amendment is supported by at least figure 5, which shows entity instance table 500 containing entity instance records which associate an entity instance table for each entity type.

Similarly the amendment to Claim 82 to recite

said desired entity type record contains
said desired entity type and specifies a
desired entity instance table of said
relational database, associated with said
desired entity type; ...

is supported by at least figure 5.

Claim 100 which recites

wherein said entity definition table means further
comprises:

a second entity type record
containing a second entity type and
specifying a second entity instance
table associated with said second
entity type; and
a third entity type record
containing a third entity type and
specifying said second entity instance
table, thereby also associating said
second entity instance table with said
third entity type.

is supported by at least Figure 5 which shows that entity instances of both entity type CU (Customers) and entity type SU (Suppliers) are stored in entity instance table T.Companies and Figure 7 which shows two entity instance tables, T.Companies and T.Addresses.

No new matter is added by this amendment.

Rejection of Claims Under 35 U.S.C. § 103

The Examiner rejected Claims 69-71 and 82-85 "under 35 U.S.C. § 103 as being unpatentable over Shimaoka et al in view of Green."

The Examiner continues to assert that storing entities in multiple tables is disclosed in Green. Specifically, the Examiner stated that

SP 105 has two entities, which are namely S# and P#. The combined table S#P# clearly indicates a relationship of S# and P# entities. As can be seen in figures 1 and 4, S# and P# are stored in different tables. (emphasis in original)

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Applicants respectfully submit that the S# and P# of Green are not entities as used in Applicant's claims. In Green, S# and P# are keys in an index to the relation tables 101 and 103.

An index is a table which relates values in one or more of a relations's columns to data base row identifiers (DRID) which identify rows 107 of the relation in which the columns have the specified value. For example, FIG. 4 shows an S# index for relation S 101, a P#index for relation P 103, and an S#,P# relationship for SP 105. ... S# is a primary key of S, P# is a primary key of P, and S#,P# are a primary key of SP. (emphasis added)

Green, Col 7, line 60 to Col 8, line 6. Thus the S# and P# are used as an internal mechanism for optimizing queries in the system disclosed in Green. Therefore, the S# and P# will not be the "desired entity instance record" that is retrieved by the data base processing system of the present application.

The Examiner also stated that "Each one of the S# table and P# table is an entity instance table" in reference to Figure 1 of Green. Applicants respectfully submit that the tables shown on Figure 1 of Green are relation instance tables not entity instance tables as used in the present application. Each row of the tables in Figure 1 of Green show a relationship between the various columns of the row. For examples row S1 of table 101 shows the relationship that supplier "SMITH" is located in "LONDON". Row P1 of table 103 shows the relationship that "NUTS" are stored in "LONDON." Therefore, the tables of Green Figure 1 are relation tables not entity tables.

The entities in these examples are SMITH, LONDON, NUTS, and LONDON. Since the entities are located within the relation itself, Green does not separately store the entities in entity instance tables. Therefore, Applicant respectfully submits that since Green teaches to store the entities within the relation tables, Green does not teach to use multiple entity instance tables.

Additional Arguments As Requested During Telephone Conference

During the telephone conference of April 3, 1996, the Examiner stated that the rows in the tables of figure 1 of Green are entities. Applicant's Attorneys argued that entity instances as used in the application and the claims do not encompass the rows in the tables of figure 1 of Green.

Specifically, as recited in the specification on page 31 lines 25-37, which describes figure 4A:

entity bubble, E-1 (Customer), does not itself encapsulate the attribute of possession as indicated by the apostrophe head character-string "'s". Instead, that attribute of possession is encapsulated by the first relationship bubble, R-1. Furthermore, the second entity, E-2 (address), does not encapsulate the modifying attribute "business". Instead that attribute is also encapsulated by the relation bubble R-1. Thus, each entity bubble (E-1, E-2, E-3) is free of any narrowing attributes or modifiers and instead, represents a relatively broad an generic listing of data items which can come under the heading of either "Customer" or "Address" or "Account".

Thus in the present application, entities refer to discrete pieces of data, that do not contain relationship information.

The rows in the tables in figure 1 of Green contains multiple pieces of data. For example row S1 of table 107, contains data that there is a supplier named Smith, a city called London, a status value of 20. More importantly row S1 also gives the relationship that supplier Smith is in London with a status value of 20. Therefore, row S1 is not an "entity instance" using the terminology of the present application.

"Entity instances" as used in the present application would encompass only discrete datum within the rows in the tables of figure 1 of Green. For example, possible entity instances would include "Smith", "Jones", "London", "Paris", "Nut", "Bolt", "Red", and "Blue".

The following tables show one way that relationship tables 107 and 103 of Green would have to be converted to use the present invention. In the following tables, abbreviations are

used for the relation names as set out below:

-SC- Supplier's City
 -SS- Supplier's Status
 -PC- Part's City
 -PR- Part's Color
 -PW- Part's Weight

Entity Definition Table

Slot #	Ent. Class Name	Name of Table
.1	SN	T.Supplier
.2	ST	T.Status
.3	CN	T.City
.4	PN	T.Part
.5	CR	T.Color
.6	WT	T.Weight

Relations Definition Table

Slot #	Rel. Name	Rel. Table Name	Head Ent. Type #	Tail Ent. Type #
.1	-SC-	T.Rel1	.1	.3
.2	-SS-	T.Rel2	.1	.2
.3	-PC-	T.Rel3	.4	.3
.4	-PR-	T.Rel4	.4	.5
.5	-PW-	T.Rel5	.4	.6

Entity Instance Tables

T.Supplier

Slot #	Supplier Name (SN)
.1	Smith
.2	Jones
.3	Blake
.4	Clark
.5	Adams

T.Status

Slot #	Status (ST)
.1	10
.2	20
.3	30

T.City

Slot #	City Name (CN)
.1	London
.2	Paris
.3	Athens
.4	Rome

T.Part

Slot #	Part Name (SN)
.1	Nut
.2	Bolt
.3	Screw
.4	Cam
.5	Cog

T.Color

Slot #	Color (CR)
.1	Red
.2	Green
.3	Blue

T.Weight

Slot #	Weight (WT)
.1	12
.2	14
.3	17
.4	19

Relation Instance Tables**T.REL1**

SLOT #	Head Ei	Rel Type	Tail Ei
.1	SN .1	-BC-	CN .1
.2	SN .2	-BC-	CN .2
.3	SN .3	-BC-	CN .2
.4	SN .4	-BC-	CN .1
.5	SN .5	-BC-	CN .3

T.REL2

SLOT #	Head Ei	Rel Type	Tail Ei
.1	SN .1	-SS-	ST .2
.2	SN .2	-SS-	ST .1
.3	SN .3	-SS-	ST .3
.4	SN .4	-SS-	ST .2
.5	SN .5	-SS-	ST .3

T.REL3

SLOT #	Head Ei	Rel Type	Tail Ei
.1	PN .1	-PC-	CN .1
.2	PN .2	-PC-	CN .2
.3	PN .3	-PC-	CN .4
.4	PN .3	-PC-	CN .1
.5	PN .4	-PC-	CN .2
.6	PN .5	-PC-	CN .1

T.REL4

SLOT #	Head Ei	Rel Type	Tail Ei
.1	PN .1	-PR-	CR .1
.2	PN .2	-PR-	CR .2
.3	PN .3	-PR-	CR .3
.4	PN .3	-PR-	CR .1
.5	PN .4	-PR-	CR .3
.6	PN .5	-PR-	CR .1

T.REL5

SLOT #	Head Ei	Rel Type	Tail Ei
.1	PN .1	-PW-	WT .1
.2	pn .2	-PW-	WT .3
.3	PN .3	-PW-	WT .3
.4	PN .3	-PW-	WT .2
.5	PN .4	-PW-	WT .1
.6	PN .5	-PW-	WT .3

As shown above, the tables in Figure 1 of Green give a combination of relation instances and entity instances as defined in the present Application. Therefore, Green does not use entity instance tables as recited in the claims and does not use a an entity definition table as recited in the Claims.

The Examiner asserted that the following definition of the join operation:

A database table operation that creates a resultant entry in another table for each entry in one table whose key field matches

that of an entry in the other.

suggests that "the entity instances are stored in different tables and the resultant table after the join operation relates entity types as well as entity instances."

Applicants respectfully submit that the Examiner has used impermissible hindsight to arrive at his assertion. The cited definition makes no claim that the "table" in the definition refers to entity tables as opposed to relation tables. The Examiner has cited no references which use multiple entity instance tables. Shimaoka teaches to use a single entity instance table to store all the entity instances. Green only teaches to use multiple relation tables which contain the entities. Applicant respectfully submits that since no references cited by the Examiner teaches multiple entity tables, the Examiner's assumption that the join operation definition refers to entity tables is obtained by impermissible hindsight reconstruction from the present application.

The Examiner further asserts that

an item code clearly suggests that entity instances may be classified under a common item code or type. One of ordinary skill in the art would be motivated to store items which belong to the same item code in a separate file in order to easily access items with the same code. Green also clearly shows separately storing different types of entities in different tables as explained above.

However, Shimaoka et al., the only reference cited by the Examiner storing entities in a separate file from relation tables, specifically teaches to use a single entity table for storing all the entities. The Examiner conceded this point by stating that "In Shimaoka et al all entities are stored in one file ..." Office Action dated April 6, 1995, page 6, line 5. As explained above, Green shows to store separate relation types in different tables not different entity types. Thus the only suggestion of multiple entity tables comes from the present application. Therefore, Applicant respectfully submits that the Examiner has used impermissible hindsight to reach his

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conclusions.

Additional Arguments Based on Second Telephone Conference

During the telephone conference of April 15, 1996, the Examiner stated that he believes that patentable subject matter exists in the entity definition table. Claim 69 has been amended to more clearly recite the entity definition table to more clearly distinguish itself from the prior art.

Specifically, amended Claim 69 recites

(i) entity definition table means comprised of at least one entity type record containing an entity type, and specifying an entity instance table associated with said entity type... (emphasis added)

Applicants respectfully submit that none of the references cited by the Examiner, teach or suggest an entity definition table. Therefore, none of the references teach or suggest to associate entity instance tables to entity types in an entity type record. Therefore, Applicant respectfully submits that Claim 69 is patentable over both Shimaoka et al and Green as well as their combination. Accordingly, Applicant requests reconsideration and withdrawal of the rejection of Claim 69 under 35 U.S.C. §103.

Applicant respectfully submits that Claims 70-71, which are dependent upon Claim 69, are patentable for at least the reasons given above with regards to Claim 69.

Claim 82 recites

said desired entity type record contains said desired entity type and specifies a desired entity instance table of said relational database, associated with said desired entity type; ...

As discussed above, none of the references cited by the examiner teach or suggest an entity type record. Therefore none of the references would have a data type record associating entity instance tables with entity types. Therefore, Applicant respectfully submits that Claim 82 is patentable over both Shimaoka et al and Green as well as their combination. Accordingly, Applicant requests reconsideration

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and withdrawal of the rejection of Claim 82 under 35 U.S.C. §103.

Applicant respectfully submits that Claims 83-85, which are dependent upon Claim 82, are patentable for at least the reasons given above with regards to Claim 82.

New Claim 100

Applicant respectfully submits that Claim 100, which is dependent upon claim 69, is patentable for at least the reasons given above with regards to Claim 69. Furthermore, Applicant respectfully submits that Claim 100 is patentable in its own right since Claim 100 recites

wherein said entity definition table means further comprises:

a second entity type record containing a second entity type and specifying a second entity instance table associated with said second entity type; and

a third entity type record containing a third entity type and specifying said second entity instance table, thereby also associating said second entity instance table with said third entity type.

As explained above, none of the references cited by the Examiner uses multiple entity instance tables. Therefore, none of the references cited by the Examiner would require an entity definition table containing entity type records. Furthermore, none of the references cited by the Examiner would have separate entity instance tables in which having "a second entity instance table associated with said second entity type" and "also associating said second entity instance table with said third entity type", as recited by Claim 100. Furthermore, even if the S# and P# of Green were entities with entity types, Green does not teach or suggest placing having a single entity instance table associated with two entity types. It is, therefore, respectfully submitted that Claim 100 is patentable.

CONCLUSION

In view of the above amendments and remarks, it is

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respectfully submitted that Claims 69-71, 82-85, and 100 are in condition for allowance and a Notice of Allowance is respectfully requested. If the Examiner contemplates action other than allowance of all the pending claims, the Examiner is requested to call Applicants' attorney below at (408) 453-9200.

Respectfully submitted,


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